

Office of Naval Research Grant # N00014-99-1-0614  
Southwest Louisiana Healthcare System, Inc.  
Lake Charles, LA  
Final Technical Report  
Community Hospital TeleHealth Consortium  
(CHTC)

**COMMUNITY HOSPITAL TELEHEALTH CONSORTIUM:  
DEVELOPMENT OF A STATEWIDE TELEHEALTH NETWORK**

Seven community hospitals sharing a singular vision for the future direction of Louisiana medicine collaborated in 1999 to form the Community Hospital TeleHealth Consortium (the CHTC). With broad and far-reaching goals, the CHTC set out to improve and expand the opportunity of rural and urban underserved patient populations to receive quality, affordable health care. The CHTC succeeded in developing a statewide network of TeleMedicine hubs and spokes – essentially seven smaller networks forming one larger unified network – poised to do just that. By the end of the Office of Naval Research award period, the CHTC had already begun delivering opportunities for provider to provider and provider to patient consultation as well as distance learning to its member institutions. Following is a report of the network that the CHTC developed and the manner in which it met each of its initial goals of improving quality of and access to health care, reducing system costs without jeopardizing outcomes, positioning Louisiana for the emerging domestic marketplace and positioning Louisiana for the international marketplace.

**THE NETWORK**

The seven hub sites, all not-for-profit community hospitals, selected an area of focus for their mini-networks and used that focus to help them determine the best locations for their spoke sites.

Lake Charles Memorial Hospital, already a lead agency and hub site to another TeleHealth network, chose to expand in the areas of cardiology and pulmonary medicine as well as diabetes education and overall wellness. They placed one TeleHealth hub station in their Heart & Vascular Center and another station in their Diabetes Education Center, which is housed with pulmonary rehab and the Wellness Center. These systems have also been used for meetings and medical education. They selected Dr. Lam Nguyen's family practice office as their remote site. Dr. Nguyen's practice is in Jennings, Louisiana, a smaller town that frequently refers patients to Lake Charles. Lake Charles Memorial also incorporated home health equipment into their network, a new direction for the LCMH TeleMedicine Department.

Our Lady of the Lake Medical Center in Baton Rouge, Louisiana, focussed on the urban underserved, placing TeleHealth stations in two after-hours clinics that serve a lower-income urban Baton Rouge population. This allows patients at either location to have a consultation with physicians who generally service just one clinic at a time. Our Lady of the Lake also implemented home health TeleMedicine, providing services for a number of hospital specialties and their patients.

Our Lady of Lourdes Medical Center in Lafayette, Louisiana, narrowed its efforts to education and meetings for 1999, with plans for expansion in the near future. They have one TeleHealth station located in a hospital conference room well suited for group medical education and administrative meetings.

Slidell Memorial Hospital, like Our Lady of the Lake, divided its focus between home health and underserved TeleMedicine; however, Slidell Memorial placed its remote TeleHealth station in a rural area: the Gaylord Family Medical Center in Bogalusa, Louisiana, with the hub station in the SMH ER quiet room. In addition to serving home health and rural patients through access to care, Slidell Memorial also plans to use this technology for medical training. They placed a third TeleHealth system in their Training & Development Center.

St. Francis Medical Center in Monroe, Louisiana, chose ophthalmology as its specialty. In an innovative move contrary to traditional TeleMedicine, St. Francis placed the remote TeleHealth system in a hospital, Jackson Parish Hospital in Jonesboro, Louisiana. They placed hub systems in the offices of two ophthalmology practices in Monroe and West Monroe, Louisiana. As a rural hospital, Jackson Parish does not have access to ophthalmology specialists such as those in the Monroe area.

Terrebonne General Medical Center in Houma, Louisiana, directed all of its attention to home health, utilizing a variety of systems to best serve the needs of their rural, remote patient base.

Willis-Knighton Medical Center in Shreveport, Louisiana, focussed on infants. They placed their remote TeleHealth station in the Minden Medical Center nursery in Minden, Louisiana, and their hub station in the NICU of their Willis-Knighton South campus. Infants at the Minden nursery needing intensive care are referred to the Willis-Knighton South NICU; this TeleHealth system allows provider to provider consultation as well as family to patient visitation. Willis-Knighton later decided to add home health to their network as well.

## DEVELOPING THE NETWORK

Developing this statewide network took a lot more than just selecting sites, however. The CHTC began by looking for the right TeleHealth equipment. To help in this process, Lake Charles Memorial hosted a two-day vendor demonstration event. A total of nine companies gave demonstrations of 12 systems. From these, three vendors were selected. American TeleCare provided home health equipment; VidiMedix provided PC TeleMedicine systems for videoconferencing and store-and-forward consults; and Raytheon provided Tylink channel service units and network integration.

The home health systems utilized plain old telephone service (POTs) transmission, which works best for quick and easy installation in a patient's home. The American TeleCare equipment came in two varieties in addition to the hub station located in each home health agency. Patient stations could be equipped either with just the camera and monitor needed for video and audio communication or with an additional stethoscope and blood pressure cuff. The hub station, in addition to the camera and monitor, housed electronic chart software for storing patient information. A total of 40 units were purchased: six base stations, two for Our Lady of the Lake and one each for Lake Charles Memorial, Slidell Memorial, Terrebonne General and Willis-Knighton; 12 video-only units, four for Our Lady of the Lake, three each for Lake Charles Memorial and Slidell Memorial and two for Willis-Knighton; and 22 video plus stethoscope and blood pressure units, 10 for Terrebonne General, five for Our Lady of the Lake, three each for

Lake Charles Memorial and Slidell Memorial and one for Willis-Knighton. Terrebonne General later purchased additional home health systems from Med-Ed-Tech, a total of three units. All home health systems were delivered by late summer.

Because Lake Charles Memorial Hospital already had a TeleMedicine system in place, the VidiMedix equipment purchased worked with what they were already using. Lake Charles Memorial was running video and audio signals over T1 lines, with mapping of the lines handled at the Lake Charles facility through a FlexServ system. Raytheon participated by providing Tylink CSU/DSUs for each site along with the necessary network integration to make sure that all sites were communicating over the T1 lines.

VidiMedix had never worked with this type of FlexServ system in the past, so their integration took a bit of debugging. By the end, however, the CHTC had a working network in which any site, remote or hub, could connect with up to three other sites through a multi-point control unit. Installation and training on this equipment were completed in November. In addition to straight video and audio connections, sites with VidiMedix equipment are able to share patient charts through Internet connections to a central server, housed at Lake Charles Memorial. One provider can register a patient and enter chart information, then upload it to the Internet and send a request to another provider to offer a store-and-forward TeleMedicine exchange or interactive videoconference consultation. The consultant can then download all of the patient information from the server, participate in a videoconference if requested, make changes and / or additions to chart information and re-upload the information to the server for use by the referring provider. Additionally, during a videoconference, both sites can share an image, making alterations and pointing out items to one another through a whiteboard type setting on the image software. Finally, the VidiMedix software also allows individual providers to send alert messages to one another to notify other providers of upcoming appointments or other events.

VidiMedix offered three types of TeleHealth systems: hub stations, with a fixed camera; remote stations, with a movable camera to aid in viewing a patient; and education systems, without the unnecessary medical records software installed. Lake Charles Memorial and Our Lady of Lourdes each purchased one hub and two remote stations; St. Francis purchased two hub and one remote station; Our Lady of the Lake purchased one hub and one remote station; and Slidell Memorial and Willis-Knighton each purchased one of each type.

This kind of statewide site to server connectivity allows providers to offer a great deal to their patients and to one another. By sharing the same electronic chart, providers can be assured that they are always looking at the most current data. By sharing images in real time, providers can be assured that they are discussing the same detail of a patient image. And by offering both of these in conjunction with real time interactive videoconferencing, providers can find the method of seeing and treating a patient best suited to the situation. All of these tools create an environment of improved patient care.

#### **IMPROVING QUALITY OF AND ACCESS TO HEALTH CARE**

Through every bit of work done via the CHTC TeleMedicine network, the consortium members are improving quality of and access to health care. This comes in the form of TeleHealth equipment in a patient's home, which directly improves access to care. It also appears as interactive and store-and-forward TeleMedicine consultations, which allow patients access to specialists without the expense of time and cost of travel, improving both quality of and

access to healthcare. Additionally, it comes in the form of opportunities for medical education for providers, which allow providers to stay abreast of the most current research and developments in their fields without having to take time and resources away from their practices, again providing both improved quality of and access to healthcare. Finally, patients benefit indirectly from the use of the equipment for program and clinic development, other activities the CHTC performs via TeleMedicine.

The ability for a patient to connect with a provider from the convenience of his or her own home equals improved access to health care. Our Lady of the Lake, Slidell Memorial and Terrebonne General have all done extensive work in the area of home health TeleMedicine, which offers patients nearly instantaneous access to health care. Whether the patient is seeking a diagnosis or advice, the access is available as soon as the patient needs it.

St. Francis Medical Center developed a strict set of success criteria to aid in the implementation of its ophthalmology clinics. By setting specific goals, St. Francis is setting the bar for TeleMedical care above what could previously be attained, and thus provides a new means of improving the quality of care through technology.

Lake Charles Memorial and Our Lady of Lourdes have worked on improving quality of care through providing distance learning opportunities for health care workers. Programs ran on topics such as Myocardial Infarction and Congestive Heart Failure. Additionally, the Diabetes Education Center at Lake Charles Memorial broadcast Medicine Grand Rounds from LSU Health Sciences Center in Shreveport, providing CME credit for Lake Charles physicians, as well as nursing classes for a student enrolled at LSU but residing in Lake Charles and working at Lake Charles Memorial. Through distance learning, the CHTC improves quality of care by keeping providers current; however, it also provides better access to care by allowing providers to learn outside of their typical scope of work.

#### **REDUCING SYSTEM COSTS WITHOUT JEOPARDIZING OUTCOMES**

Home health equipment offers the most detectable means of reducing systems costs without jeopardizing outcomes. Effective monitoring of patients at home can result in earlier discharges, saving the health care system money. Access to medical advice also can reduce unnecessary emergency room visits, saving costs for the health care system and patient. Providing TeleMedicine consultations and education reduces system costs in a less direct manner; however, it still does save. By allowing patients to meet with specialists from a distance, TeleMedicine saves the time away from work and cost of having to travel to a larger city where specialists are available. By allowing health care providers to participate in distance education opportunities, TeleMedicine saves the time away from work and cost of having to travel to a larger city where seminars and rounds are more available. Both save time and money for the health care system and patients. Both also produce better outcomes, by providing specialist care to patients and ensuring that providers are kept up to date in their fields.

#### **POSITIONING LOUISIANA FOR THE EMERGING DOMESTIC MARKETPLACE**

The success of the CHTC project has already taken it into the regional marketplace, with three Mississippi hospitals coming on board for 2000 and discussions taking place with health care providers in Arkansas. Obviously, the CHTC cannot continue to add new consortium members indefinitely; however, with a broader base of community hospital support, the CHTC is

setting standards for providing treatment through technology and leading the way in collaborative efforts in developing TeleMedicine systems. Other providers seeking to develop a TeleMedicine network will look to the CHTC for consultation and guidance.

### **POSITIONING LOUISIANA FOR THE INTERNATIONAL MARKETPLACE**

In developing a network of such complexity, the CHTC has carved out a niche as a key player in TeleMedicine. As the barriers between health care systems across national borders begin to fade, health care systems and consortia already so established will be the first to offer health care to foreign patients through the use of this technology.

### **CONCLUSION**

In conclusion, through meeting all of its initial goals, the CHTC has established itself as an organization dedicated to pulling out all of the stops and making the most of technology to provide the best in patient care. Perhaps a few success stories offered by some of the CHTC members would best illustrate the great accomplishments they have made already.

From Our Lady of the Lake Home Health: "Our Lady of the Lake Home Health set out to blaze new trails in Home Care through its TeleMedicine program in late July 1999. Almost immediately, indications for use of the equipment were identified. Policies and procedures were written, protocols were developed and staff members' training began in early September with an implementation timeline set for October 15, 1999. All we needed to begin was the perfect patient.

"The perfect patient presented himself on Friday, October 1. Although we were a little apprehensive about starting the program on the weekend, this patient was a special case with a very poor prognosis. At that time, he was a Home Care patient in the cardiac program with End Stage Congestive Heart Failure. He was being maintained at home on Inotropic Therapy, which included Dopamine and Dobutamine, as well as PRN doses of Lasix and Bumex. Realizing the possibility that further medical intervention and, mostly likely, mechanical ventilation would be needed in the near future, the patient and his family had decided to keep him at home as long as possible.

"His Home Health nurse, Ann Arbour, a cardiovascular RN for over 10 years, came to the development team seeking a way to help him and explained his case. During the past week, the patient had experienced several episodes of cardiac decompensation requiring frequent adjustments in his Inotropic therapy and dosages of his PRN diuretic. Although his symptoms would improve with the adjustments in his therapy and medications, the need for on-the-scene assessment and intervention was too much for his family to handle, as they had no medical background. TeleMedicine seemed to be the perfect solution. A 1010 patient unit was placed in his home, and his daughter was trained to use it. The hub nurses' station was then set up in his nurse's home, and in less than three hours, we had the capability for on-the-scene assessment and intervention.

"The patient continued his therapy at home over the weekend with frequent assessments by his nurse. Although no intervention was needed, he and his family were able to enjoy the weekend without the stress and worry of his condition changing and their not being able to handle the situation. On the following Monday, the patient was admitted to the hospital for the last time and died with his family around him.

“Although the patient’s outcome may not seem positive, it was expected. While some may see this story as successfully reducing the costs of expensive health care resources through delaying a hospital admission, this is not how it is viewed by the Home Care team or the patient’s family. The real success of Our Lady of the Lake Home Health TeleMedicine program can be measured by the dignity provided to this patient in his final days and, as well, by the precious time that TeleMedicine provided for him and the people whom he loved the most.”

At Willis-Knighton Medical Center, in addition to allowing for physician to physician and physician to patient consultations between the Willis-Knighton South NICU and the Minden Medical Center nursery through the TeleMedicine systems, families can see and hear infants transferred to the NICU from the nursery. In just the short time between system implementation and the end of the award period, the Willis-Knighton South NICU – Minden nursery link produced two successful doctor to doctor consultations. Additionally, it provided two opportunities for a family to view their premature infant that had been sent to intensive care in Shreveport, a heart-warming spin on a traditional TeleMedicine success story.

From Slidell Memorial Hospital Home Health: “On October 1, 1999, we delivered our first 1010SL unit to a patient diagnosed with cancer of the larynx. The emotional stress of this new diagnosis along with the adjustments in lifestyle, caused frustration for the wife, whose physical condition is deteriorating. The wife verbalized no desire to assist with the suctioning and trach care needs. This situation placed an additional need for skilled support in the home. The patient and his wife were very excited to become a part of this new technology being offered, and take great pride in being the first to try this equipment in Slidell. They have spoken to several of their family and friends about their unit and how much they like it. This method of technology has allowed a face-to-face visit from a distance that is quite personable. The patient and his wife are actively participating in the use of the TeleMedicine equipment. Due to the patient’s inability to speak, the TeleMedicine unit has served as a video to allow the nurse to view the patient’s handwritten notes. The patient and his wife have developed a great confidence in the equipment. They easily obtain blood pressures and know exactly where to place the stethoscope when asked. Their ability to maneuver the camera for the nurse to see the readings was accomplished without fail. Because this patient is doing so well physically, his physician had decided to decrease his skilled nurse visits to the home. Of course, they hate to hear that the nurse isn’t going to come out as often to their home, but they are adamant that they do not want to stop the TeleMedicine visits. They told the nurse that the wanted to keep the equipment and her forever. The patient has shown continued progress in trach management and is now receiving outpatient radiation in addition to the skilled home visits and TeleMedicine visits. Without the TeleMedicine equipment, the wife has stated that she would be nervous about the supervision for potential decompensation of radiation therapy.”

Even setting these stories aside, the greatest work of the CHTC will become evident in the years to come, as the network developed in this project continues to make strides in improving quality of and access to reasonably priced health care for all patient populations.

## REPORT DOCUMENTATION PAGE

Form Approved  
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Washington Headquarters Service, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington, DC 20503.

**PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.**

<b>1. REPORT DATE (DD-MM-YYYY)</b> 25-02-2000				<b>2. REPORT DATE</b> Final Technical Report		<b>3. DATES COVERED (From - To)</b> 01-01-1999 - 01-12-1999	
<b>4. TITLE AND SUBTITLE</b>  Community Hospital TeleHealth Consortium: Development of a Statewide TeleHealth Network				<b>5a. CONTRACT NUMBER</b> N00014-99-1-0614  <b>5b. GRANT NUMBER</b>  <b>5c. PROGRAM ELEMENT NUMBER</b>  			
<b>6. AUTHOR(S)</b>  Morris, Amy, L. J.				<b>5d. PROJECT NUMBER</b>  <b>5e. TASK NUMBER</b>  <b>5f. WORK UNIT NUMBER</b>  			
<b>7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)</b>  Southwest Louisiana Healthcare System CHTC TeleMed / LCMH 1701 Oak Park Boulevard Lake Charles, LA 70601					<b>8. PERFORMING ORGANIZATION REPORT NUMBER</b>  First and Final		
<b>9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)</b>  Office of Naval Research 800 North Quincy Street Arlington, VA 22217-5660					<b>10. SPONSOR/MONITOR'S ACRONYM(S)</b> ONR  <b>11. SPONSORING/MONITORING AGENCY REPORT NUMBER</b>  		
<b>12. DISTRIBUTION AVAILABILITY STATEMENT</b>  Approved for public release							
<b>13. SUPPLEMENTARY NOTES</b>							
<b>14. ABSTRACT</b>  The Community Hospital TeleHealth Consortium developed a statewide TeleHealth network comprised of seven smaller networks. Each smaller network was supported by a community not for profit hospital. This TeleHealth network has been used for provider to provider consultation, provider to patient consultation, family to patient visitation and distance learning opportunities. The infrastructure developed as a result of this project will serve communities across the state of Louisiana in the years to come through improved access to and quality of health care. This type of infrastructure development also positions Louisiana for an important role in the emerging domestic and international TeleHealth marketplaces.							
<b>15. SUBJECT TERMS</b>							
<b>16. SECURITY CLASSIFICATION OF:</b>			<b>17. LIMITATION OF ABSTRACT</b>	<b>18. NUMBER OF PAGES</b>	<b>19a. NAME OF RESPONSIBLE PERSON</b> Amy L. J. Morris  <b>19b. TELEPHONE NUMBER (Include area code)</b> 337/494-2861		
<b>a. REPORT</b>	<b>b. ABSTRACT</b>	<b>c. THIS PAGE</b>	SAR	6			